

# PARTICLE SIZE REDUCTION AND ENZYME SUPPLEMENTATION REDUCE NUTRIENT EXCRETION

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## Summary

Diets based on barley and peas ground to three different particle sizes and with one of four enzyme treatments were fed to growing pigs. Reducing particle size below 700 mm was most effective in reducing nitrogen excretion while the addition of phytase was most effective in reducing phosphorus excretion.

## Introduction

Nutrient management in hog production might impact the long-term sustainability of the industry. One approach is to minimize the amount of nutrients, primarily nitrogen (N) and phosphorus (P), being produced by each operation. Two strategies by which this may be accomplished are particle size reduction and enzyme supplementation.

## Experimental Procedures

Three particle sizes (400, fine; 700, medium; and 850 mm, coarse) were compared within four enzyme treatments (control, carbohydrase ( $\beta$ -glucanase and xylanase), phytase, and phytase with carbohydrase) for a total of 12 experimental diets. Diets were based on barley (70%) and field peas (25%) and were fed in wet mash form.

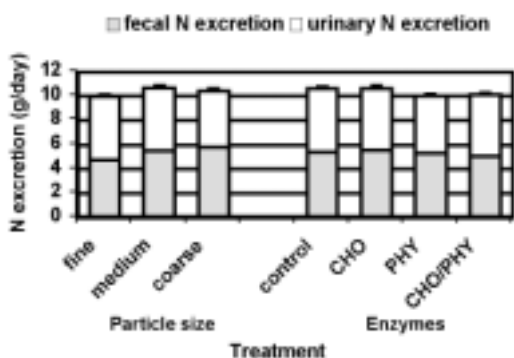


Figure 1. Total nitrogen excretion

## Results and Discussion

Total N excretion was reduced by 6.8% for fine compared to medium particle size ( $P < 0.05$ ). The addition of phytase reduced total N excretion by 5.5% compared to the control. Fecal and total P excretion were reduced 35% by phytase and 22% by phytase and carbohydrase supplementation respectively, compared to the control ( $P < 0.05$ ). Addition of carbohydrase enzymes did not affect either N or P excretion.

## Implications

Reducing particle size below 700 mm proved effective in increasing the digestibility of several nutrients in the diet, and in altering N excretion patterns. Phytase proved very effective in improving the retention of P from the diet, while the addition of carbohydrase showed little benefit in reducing N or P excretion.

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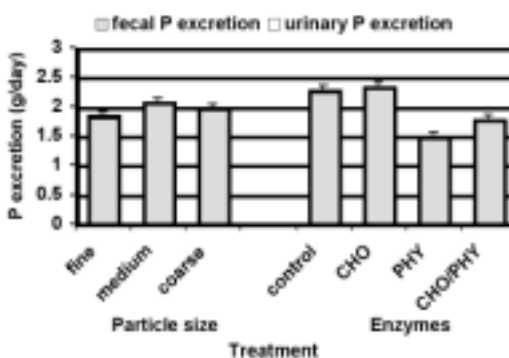


Figure 2. Total phosphorus excretion

*Reduced feed particle size and phytase supplement reduces nutrient excretion.*

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